



SEQUENCE LISTING

<110> Queen, Cary L.
Selick, Harold E.

<120> IMPROVED HUMANIZED IMMUNOGLOBULINS

<130> 011823-002660US

<140> US 09/718,998

<141> 2000-11-22

<150> US 08/484,537

<151> 1995-06-07

<150> US 07/634,278

<151> 1990-12-19

<150> US 07/590,274

<151> 1990-09-28

<150> US 07/310,252

<151> 1989-02-13

<150> US 07/290,975

<151> 1988-12-28

<160> 113

<170> PatentIn version 3.1

<210> 1
 <211> 106
 <212> PRT
 <213> Mus sp.

<400> 1

Gln Ile Val Leu Thr Gln Ser Pro Ala Ile Met Ser Ala Ser Pro Gly
 1 5 10 15

Glu Lys Val Thr Ile Thr Cys Ser Ala Ser Ser Ser Ile Ser Tyr Met
 20 25 30

His Trp Phe Gln Gln Lys Pro Gly Thr Ser Pro Lys Leu Trp Ile Tyr
 35 40 45

Thr Thr Ser Asn Leu Ala Ser Gly Val Pro Ala Arg Phe Ser Gly Ser
 50 55 60

Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Arg Met Glu Ala Glu
 65 70 75 80

Asp Ala Ala Thr Tyr Tyr Cys His Gln Arg Ser Thr Tyr Pro Leu Thr
 85 90 95

Phe Gly Ser Gly Thr Lys Leu Glu Leu Lys
 100 105

<210> 2
 <211> 107
 <212> PRT
 <213> Homo sapiens

<400> 2

Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
 1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Asn Thr Trp
 20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Met
 35 40 45

Tyr Lys Ala Ser Ser Leu Glu Ser Gly Val Pro Ser Arg Phe Ile Gly
 50 55 60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
 65 70 75 80

Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asn Ser Asp Ser Lys
 85 90 95

Met Phe Gly Gln Gly Thr Lys Val Glu Val Lys
 100 105

<210> 3

<211> 116

<212> PRT

<213> Mus sp.

<400> 3

Gln Val Gln Leu Gln Gln Ser Gly Ala Glu Leu Ala Lys Pro Gly Ala
 1 5 10 15

Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Ser Tyr
 20 25 30

Arg Met His Trp Val Lys Gln Arg Pro Gly Gln Gly Leu Glu Trp Ile
 35 40 45

Gly Tyr Ile Asn Pro Ser Thr Gly Tyr Thr Glu Tyr Asn Gln Lys Phe
 50 55 60

Lys Asp Lys Ala Thr Leu Thr Ala Asp Lys Ser Ser Ser Thr Ala Tyr
 65 70 75 80

Met Gln Leu Ser Ser Leu Thr Phe Glu Asp Ser Ala Val Tyr Tyr Cys
 85 90 95

Ala Arg Gly Gly Gly Val Phe Asp Tyr Trp Gly Gln Gly Thr Thr Leu
 100 105 110

Thr Val Ser Ser

115

<210> 4

<211> 117

<212> PRT

<213> Homo sapiens

<400> 4

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Gly Thr Phe Ser Arg Ser
20 25 30

Ala Ile Ile Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Gly Ile Val Pro Met Phe Gly Pro Pro Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Asn Thr Ala Tyr
65 70 75 80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Phe Tyr Phe Cys
85 90 95

Ala Gly Gly Tyr Gly Ile Tyr Ser Pro Glu Glu Tyr Asn Gly Gly Leu
100 105 110

Val Thr Val Ser Ser
115

<210> 5

<211> 116

<212> PRT

<213> Artificial Sequence

<220>

<223> Variable region of the PDL humanized anti-Tac antibody heavy chain

<400> 5

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Ser Tyr
20 25 30

Arg Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Tyr Ile Asn Pro Ser Thr Gly Tyr Thr Glu Tyr Asn Gln Lys Phe
50 55 60

Lys Asp Lys Ala Thr Ile Thr Ala Asp Glu Ser Thr Asn Thr Ala Tyr
65 70 75 80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Gly Gly Gly Val Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val
100 105 110

Thr Val Ser Ser
115

<210> 6

<211> 116

<212> PRT

<213> Artificial Sequence

<220>

<223> Variable region of the CDR-only humanized anti-Tac antibody heavy
chain

<400> 6

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Gly Thr Phe Ser Ser Tyr
20 25 30

Arg Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met

35 40 45
 Gly Tyr Ile Asn Pro Ser Thr Gly Tyr Thr Glu Tyr Asn Gln Lys Phe
 50 55 60
 Lys Asp Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Asn Thr Ala Tyr
 65 70 75 80
 Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Phe Tyr Phe Cys
 85 90 95
 Ala Gly Gly Gly Gly Val Phe Asp Tyr Glu Tyr Asn Gly Gly Leu Val
 100 105 110
 Thr Val Ser Ser
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 <211> 106
 <212> PRT
 <213> Artificial Sequence

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 <223> Variable region of the PDL humanized anti-Tac antibody light chain
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 <400> 7
 Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
 1 5 10 15
 Asp Arg Val Thr Ile Thr Cys Ser Ala Ser Ser Ser Ile Ser Tyr Met
 20 25 30
 His Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile Tyr
 35 40 45
 Thr Thr Ser Asn Leu Ala Ser Gly Val Pro Ala Arg Phe Ser Gly Ser
 50 55 60
 Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro Asp
 65 70 75 80
 Asp Phe Ala Thr Tyr Tyr Cys His Gln Arg Ser Thr Tyr Pro Leu Thr

85

90

95

Phe Gly Gln Gly Thr Lys Val Glu Val Lys
 100 105

<210> 8

<211> 106

<212> PRT

<213> Artificial Sequence

<220>

<223> Variable region of the CDR-only humanized anti-Tac antibody light chain

<400> 8

Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
 1 5 10 15

Asp Arg Val Thr Ile Thr Cys Ser Ala Ser Ser Ser Ile Ser Tyr Met
 20 25 30

His Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Met Tyr
 35 40 45

Thr Thr Ser Asn Leu Ala Ser Gly Val Pro Ser Arg Phe Ile Gly Ser
 50 55 60

Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro Asp
 65 70 75 80

Asp Phe Ala Thr Tyr Tyr Cys His Gln Arg Ser Thr Tyr Pro Leu Thr
 85 90 95

Phe Gly Gln Gly Thr Lys Val Glu Val Lys
 100 105

<210> 9

<211> 443

<212> DNA

<213> Artificial Sequence

<220>

<223> Sequence encoding heavy chain variable region of CDR-only humanized anti-Tac antibody including signal sequence

<400> 9
agcttctaga tgggatggag ctggatcttt ctcttctcc tgtcaggtac cgcgggcgtg 60
cactctcagg tccagcttgt ccagtctggg gctgaagtca agaaacctgg ctcgagcgtg 120
aaggctctct gcaaggcttc tggcgggacc ttttctagct acaggatgca ctgggtaagg 180
caggcccctg gacaggggtct ggaatggatg ggatatatta atccgtcgac tgggtatact 240
gaatacaatc agaagttcaa ggacagggtc acaattactg cagacgaatc caccaataca 300
gcctacatgg aactgagcag cctgagatct gaggacaccg cattctatct ctgtgcaggg 360
gggtgggggag tctttgacta cgaatacaat ggagggctgg tcacagtctc ctcaggtgag 420
tccttaaaac ctctagacga tat 443

<210> 10

<211> 411

<212> DNA

<213> Artificial Sequence

<220>

<223> Sequence encoding light chain variable region of CDR-only humanized anti-Tac antibody including signal sequence

<400> 10
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tcaaccggag atattcagat gaccagctct ccattctacc tctctgctag cgctcggggat 120
agggtcacca taacctgctc tgccagctca agtataagtt acatgcactg gtaccagcag 180
aagccaggca aagctcccaa gcttctaatt tataccacat ccaacctggc ttctggagtc 240
ccttctcgtc tcattggcag tggatctggg accgagttca cctcacaat cagctctctg 300
cagccagatg atttcgccac ttattactgc catcaaagga gtacttacc actcacgttc 360
ggtcagggga ccaaggtgga ggtcaaactg aagtacactt ttctagatat a 411

<210> 11

<211> 29

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer mc045

<400> 11

taatctagaa ttcccccccc cccccccc

29

<210> 12

<211> 46

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer mc045

<400> 12

tatagagctc aagcttggat ggtgggaaga tggatacagt tgggtgc

46

<210> 13

<211> 50

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer mc047

<400> 13

tatagagctc aagcttccag tggatagach gatggggstg tygttttggc

50

<210> 14

<211> 116

<212> PRT

<213> Artificial Sequence

<220>

<223> Anti-Tac heavy chain amino acid sequence

<400> 14

Gln Val Gln Leu Gln Gln Ser Gly Ala Glu Leu Ala Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Ser Tyr
20 25 30

Arg Met His Trp Val Lys Gln Arg Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Tyr Ile Asn Pro Ser Thr Gly Tyr Thr Glu Tyr Asn Gln Lys Phe
50 55 60

Lys Asp Lys Ala Thr Leu Thr Ala Asp Lys Ser Ser Ser Thr Ala Tyr
65 70 75 80

Met Gln Leu Ser Ser Leu Thr Phe Glu Asp Ser Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Gly Gly Gly Val Phe Asp Tyr Trp Gly Gln Gly Thr Thr Leu
100 105 110

Thr Val Ser Ser
115

<210> 15

<211> 117

<212> PRT

<213> Artificial Sequence

<220>

<223> Eu heavy chain amino acid sequence

<400> 15

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Gly Thr Phe Ser Arg Ser
20 25 30

Ala Ile Ile Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Gly Ile Val Pro Met Phe Gly Pro Pro Asn Tyr Ala Gln Lys Phe
 50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Asn Thr Ala Tyr
 65 70 75 80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Phe Tyr Phe Cys
 85 90 95

Ala Gly Gly Tyr Gly Ile Tyr Ser Pro Glu Glu Tyr Asn Gly Gly Leu
 100 105 110

Val Thr Val Ser Ser
 115

<210> 16

<211> 106

<212> PRT

<213> Artificial Sequence

<220>

<223> Anti-Tac light chain amino acid sequence

<400> 16

Gln Ile Val Leu Thr Gln Ser Pro Ala Ile Met Ser Ala Ser Pro Gly
 1 5 10 15

Glu Lys Val Thr Ile Thr Cys Ser Ala Ser Ser Ser Ile Ser Tyr Met
 20 25 30

His Trp Phe Gln Gln Lys Pro Gly Thr Ser Pro Lys Leu Trp Ile Tyr
 35 40 45

Thr Thr Ser Asn Leu Ala Ser Gly Val Pro Ala Arg Phe Ser Gly Ser
 50 55 60

Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Arg Met Glu Ala Glu
 65 70 75 80

Asp Ala Ala Thr Tyr Tyr Cys His Gln Arg Ser Thr Tyr Pro Leu Thr
 85 90 95

Phe Gly Ser Gly Thr Lys Leu Glu Leu Lys
100 105

<210> 17

<211> 107

<212> PRT

<213> Artificial Sequence

<220>

<223> Eu light chain amino acid sequence

<400> 17

Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Asn Thr Trp
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Met
35 40 45

Tyr Lys Ala Ser Ser Leu Glu Ser Gly Val Pro Ser Arg Phe Ile Gly
50 55 60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asn Ser Asp Ser Lys
85 90 95

Met Phe Gly Gln Gly Thr Lys Val Glu Val Lys
100 105

<210> 18

<211> 433

<212> DNA

<213> Artificial Sequence

<220>

<223> Humanized anti-Tac heavy chain variable region

<220>

<221> CDS

<222> (6)..(410)

<223>

<400> 18

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| tctag atg gga tgg agc tgg atc ttt ctc ttc ctc ctg tca ggt acc gcg | 50 |
| Met Gly Trp Ser Trp Ile Phe Leu Phe Leu Leu Ser Gly Thr Ala | |
| 1 5 10 15 | |

| | |
|---|----|
| ggc gtg cac tct cag gtc cag ctt gtc cag tct ggg gct gaa gtc aag | 98 |
| Gly Val His Ser Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys | |
| 20 25 30 | |

| | |
|---|-----|
| aaa cct ggc tcg agc gtg aag gtc tcc tgc aag gct tct ggc tac acc | 146 |
| Lys Pro Gly Ser Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr | |
| 35 40 45 | |

| | |
|---|-----|
| ttt act agc tac agg atg cac tgg gta agg cag gcc cct gga cag ggt | 194 |
| Phe Thr Ser Tyr Arg Met His Trp Val Arg Gln Ala Pro Gly Gln Gly | |
| 50 55 60 | |

| | |
|---|-----|
| ctg gaa tgg att gga tat att aat ccg tcg act ggg tat act gaa tac | 242 |
| Leu Glu Trp Ile Gly Tyr Ile Asn Pro Ser Thr Gly Tyr Thr Glu Tyr | |
| 65 70 75 | |

| | |
|---|-----|
| aat cag aag ttc aag gac aag gca aca att act gca gac gaa tcc acc | 290 |
| Asn Gln Lys Phe Lys Asp Lys Ala Thr Ile Thr Ala Asp Glu Ser Thr | |
| 80 85 90 95 | |

| | |
|---|-----|
| aat aca gcc tac atg gaa ctg agc agc ctg aga tct gag gac acc gca | 338 |
| Asn Thr Ala Tyr Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala | |
| 100 105 110 | |

| | |
|---|-----|
| gtc tat tac tgt gca aga ggg ggg ggg gtc ttt gac tac tgg ggc caa | 386 |
| Val Tyr Tyr Cys Ala Arg Gly Gly Gly Val Phe Asp Tyr Trp Gly Gln | |
| 115 120 125 | |

| | |
|---|-----|
| gga acc ctg gtc aca gtc tcc tca ggtgagtcct taaaacctct aga | 433 |
| Gly Thr Leu Val Thr Val Ser Ser | |
| 130 135 | |

<210> 19

<211> 135

<212> PRT

<213> Artificial Sequence

<220>

<223> Humanized anti-Tac heavy chain variable region

<400> 19

Met Gly Trp Ser Trp Ile Phe Leu Phe Leu Leu Ser Gly Thr Ala Gly
1 5 10 15

Val His Ser Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys
20 25 30

Pro Gly Ser Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe
35 40 45

Thr Ser Tyr Arg Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu
50 55 60

Glu Trp Ile Gly Tyr Ile Asn Pro Ser Thr Gly Tyr Thr Glu Tyr Asn
65 70 75 80

Gln Lys Phe Lys Asp Lys Ala Thr Ile Thr Ala Asp Glu Ser Thr Asn
85 90 95

Thr Ala Tyr Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val
100 105 110

Tyr Tyr Cys Ala Arg Gly Gly Gly Val Phe Asp Tyr Trp Gly Gln Gly
115 120 125

Thr Leu Val Thr Val Ser Ser
130 135

<210> 20

<211> 403

<212> DNA

<213> Artificial Sequence

<220>

<223> Humanized anti-Tac light chain variable region

<220>

<221> CDS

<222> (6)..(383)

<223>

<400> 20

tctag atg gag acc gat acc ctc ctg cta tgg gtc ctc ctg cta tgg gtc 50
Met Glu Thr Asp Thr Leu Leu Leu Trp Val Leu Leu Leu Trp Val
1 5 10 15

cca gga tca acc gga gat att cag atg acc cag tct cca tct acc ctc 98
Pro Gly Ser Thr Gly Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu
20 25 30

tct gct agc gtc ggg gat agg gtc acc ata acc tgc tct gcc agc tca 146
Ser Ala Ser Val Gly Asp Arg Val Thr Ile Thr Cys Ser Ala Ser Ser
35 40 45

agt ata agt tac atg cac tgg tac cag cag aag cca ggc aaa gct ccc 194
Ser Ile Ser Tyr Met His Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro
50 55 60

aag ctt cta att tat acc aca tcc aac ctg gct tct gga gtc cct gct 242
Lys Leu Leu Ile Tyr Thr Thr Ser Asn Leu Ala Ser Gly Val Pro Ala
65 70 75

cgc ttc agt ggc agt gga tct ggg acc gag ttc acc ctc aca atc agc 290
Arg Phe Ser Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser
80 85 90 95

tct ctg cag cca gat gat ttc gcc act tat tac tgc cat caa agg agt 338
Ser Leu Gln Pro Asp Asp Phe Ala Thr Tyr Tyr Cys His Gln Arg Ser
100 105 110

act tac cca ctc acg ttc ggt cag ggg acc aag gtg gag gtc aaa 383
Thr Tyr Pro Leu Thr Phe Gly Gln Gly Thr Lys Val Glu Val Lys
115 120 125

cgtaagtaca cttttctaga 403

<210> 21

<211> 126

<212> PRT

<213> Artificial Sequence

<220>

<223> Humanized anti-Tac light chain variable region

<400> 21

Met Glu Thr Asp Thr Leu Leu Leu Trp Val Leu Leu Leu Trp Val Pro
1 5 10 15

Gly Ser Thr Gly Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser

| 20 | | | | | | | | | | 25 | | | | | 30 | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|--|--|
| Ala | Ser | Val | Gly | Asp | Arg | Val | Thr | Ile | Thr | Cys | Ser | Ala | Ser | Ser | Ser | | | | |
| | | 35 | | | | | 40 | | | | | 45 | | | | | | | |
| Ile | Ser | Tyr | Met | His | Trp | Tyr | Gln | Gln | Lys | Pro | Gly | Lys | Ala | Pro | Lys | | | | |
| | 50 | | | | | 55 | | | | | 60 | | | | | | | | |
| Leu | Leu | Ile | Tyr | Thr | Thr | Ser | Asn | Leu | Ala | Ser | Gly | Val | Pro | Ala | Arg | | | | |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 | | | | |
| Phe | Ser | Gly | Ser | Gly | Ser | Gly | Thr | Glu | Phe | Thr | Leu | Thr | Ile | Ser | Ser | | | | |
| | | | 85 | | | | | | 90 | | | | | 95 | | | | | |
| Leu | Gln | Pro | Asp | Asp | Phe | Ala | Thr | Tyr | Tyr | Cys | His | Gln | Arg | Ser | Thr | | | | |
| | | | 100 | | | | | 105 | | | | | 110 | | | | | | |
| Tyr | Pro | Leu | Thr | Phe | Gly | Gln | Gly | Thr | Lys | Val | Glu | Val | Lys | | | | | | |
| | | 115 | | | | | 120 | | | | | 125 | | | | | | | |

<210> 22

<211> 126

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo HES12

<400> 22

agcttctaga tgggatggag ctggatcttt ctcttcctcc tgtcaggtac cgcgggcggtg 60

cactctcagg tccagcttgt ccagtctggg gctgaagtca agaaacctgg ctcgagcggtg 120

aaggtc 126

<210> 23

<211> 129

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo HES13

<400> 23

cccagtcgac ggattaatat atccaatcca ttccagaccc tgtccagggg cctgccttac 60

ccagtgcatc ctgtagctag taaaggtgta gccagaagcc ttgcaggaga ccttcacgct 120

cgagccagg 129

<210> 24

<211> 124

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo HES14

<400> 24

tatattaatc cgtcgactgg gtatactgaa tacaatcaga agttcaagga caaggcaaca 60

attactgcag acgaatccac caatacagcc tacatggaac tgagcagcct gagatctgag 120

gaca 124

<210> 25

<211> 128

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo HES15

<400> 25

atatcgtcta gaggttttaa ggactcacct gaggagactg tgaccagggt tccttgcccc 60

cagtagtcaa agaccccccc ccctcttgca cagtaataga ctgcggtgtc ctcagatctc 120

aggctgct 128

<210> 26

<211> 120

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo JFD1

<400> 26

caaattctaga tggagaccga taccctcctg ctatgggtcc tcttgctatg ggtcccagga 60

tcaaccggag atattcagat gaccacgtct ccatctaccc tctctgctag cgtcggggat 120

<210> 27

<211> 114

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo JFD2

<400> 27

ataaattaga agcttgggag ctttgccctgg cttctgctgg taccagtgcg tgtaacttat 60

acttgagctg gcagagcagg ttatggtgac cctatccccg acgctagcag agag 114

<210> 28

<211> 123

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo JFD3

<400> 28

gctcccaagc ttctaattta taccacatcc aacctggctt ctggagtccc tgcctgcttc 60

agtggcagtg gatctgggac cgagttcacc ctcacaatca gctctctgca gccagatgat 120

ttc 123

<210> 29

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<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo JFD4

<400> 29

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tgggtaagta ctcctttgat ggcagtaata agtggcgaaa tcattctggct gcagagagct 120

ga 122

<210> 30

<211> 384

<212> DNA

<213> Artificial Sequence

<220>

<223> Light chain variable region of mik-betal

<220>

<221> CDS

<222> (1)..(384)

<223>

<400> 30

atg gat ttt caa gtg cag att ttc agc ttc ctg cta atc agt gcc tca 48
Met Asp Phe Gln Val Gln Ile Phe Ser Phe Leu Leu Ile Ser Ala Ser
1 5 10 15

gtc ata ctg tcc aga gga caa att gtt ctc acc cag tct cca gca atc 96
Val Ile Leu Ser Arg Gly Gln Ile Val Leu Thr Gln Ser Pro Ala Ile
20 25 30

atg tct gcg tct cca ggg gag aag gtc acc atg acc tgc agt ggc agc 144
Met Ser Ala Ser Pro Gly Glu Lys Val Thr Met Thr Cys Ser Gly Ser
35 40 45

tca agt gta agt ttc atg tac tgg tac cag cag agg cca gga tcc tcc 192
Ser Ser Val Ser Phe Met Tyr Trp Tyr Gln Gln Arg Pro Gly Ser Ser
50 55 60

ccc aga ctc ctg att tat gac aca tcc aac ctg gct tct gga gtc cct 240
Pro Arg Leu Leu Ile Tyr Asp Thr Ser Asn Leu Ala Ser Gly Val Pro
65 70 75 80

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| gtt | cgc | ttc | agt | ggc | agt | ggg | tct | ggg | acc | tct | tac | tct | ctc | aca | atc | 288 |
| Val | Arg | Phe | Ser | Gly | Ser | Gly | Ser | Gly | Thr | Ser | Tyr | Ser | Leu | Thr | Ile | |
| | | | | 85 | | | | | 90 | | | | | 95 | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| agc | cga | atg | gag | gct | gaa | gat | gct | gcc | act | tat | tac | tgc | cag | cag | tgg | 336 |
| Ser | Arg | Met | Glu | Ala | Glu | Asp | Ala | Ala | Thr | Tyr | Tyr | Cys | Gln | Gln | Trp | |
| | | | 100 | | | | | 105 | | | | | 110 | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| agt | act | tac | ccg | ctc | acg | ttc | ggg | gct | ggg | acc | aag | ctg | gag | ctg | aaa | 384 |
| Ser | Thr | Tyr | Pro | Leu | Thr | Phe | Gly | Ala | Gly | Thr | Lys | Leu | Glu | Leu | Lys | |
| | | 115 | | | | | 120 | | | | | 125 | | | | |

<210> 31

<211> 128

<212> PRT

<213> Artificial Sequence

<220>

<223> Light chain variable region of mik-betal

<400> 31

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| Met | Asp | Phe | Gln | Val | Gln | Ile | Phe | Ser | Phe | Leu | Leu | Ile | Ser | Ala | Ser |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Val | Ile | Leu | Ser | Arg | Gly | Gln | Ile | Val | Leu | Thr | Gln | Ser | Pro | Ala | Ile |
| | | | 20 | | | | | 25 | | | | | 30 | | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Ser | Ala | Ser | Pro | Gly | Glu | Lys | Val | Thr | Met | Thr | Cys | Ser | Gly | Ser |
| | | 35 | | | | | 40 | | | | | 45 | | | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ser | Ser | Val | Ser | Phe | Met | Tyr | Trp | Tyr | Gln | Gln | Arg | Pro | Gly | Ser | Ser |
| | 50 | | | | | 55 | | | | | 60 | | | | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Pro | Arg | Leu | Leu | Ile | Tyr | Asp | Thr | Ser | Asn | Leu | Ala | Ser | Gly | Val | Pro |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Val | Arg | Phe | Ser | Gly | Ser | Gly | Ser | Gly | Thr | Ser | Tyr | Ser | Leu | Thr | Ile |
| | | | | 85 | | | | | 90 | | | | | 95 | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ser | Arg | Met | Glu | Ala | Glu | Asp | Ala | Ala | Thr | Tyr | Tyr | Cys | Gln | Gln | Trp |
| | | | 100 | | | | | 105 | | | | | 110 | | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ser | Thr | Tyr | Pro | Leu | Thr | Phe | Gly | Ala | Gly | Thr | Lys | Leu | Glu | Leu | Lys |
| | | 115 | | | | | 120 | | | | | 125 | | | |

<210> 32
 <211> 414
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Heavy chain variable region of mik-betal
 <220>
 <221> CDS
 <222> (1)..(414)
 <223>

| | |
|---|-----|
| <400> 32 | |
| atg gct gtc ttg ggg ctg ctc ttc tgc ctg gtg aca ttc cca agc tgt | 48 |
| Met Ala Val Leu Gly Leu Leu Phe Cys Leu Val Thr Phe Pro Ser Cys | |
| 1 5 10 15 | |
| gtc cta tcc cag gtg cag ctg aag cag tca gga cct ggc cta gtg cag | 96 |
| Val Leu Ser Gln Val Gln Leu Lys Gln Ser Gly Pro Gly Leu Val Gln | |
| 20 25 30 | |
| ccc tca cag agc ctg tcc atc acc tgc aca gtc tct ggt ttc tca gta | 144 |
| Pro Ser Gln Ser Leu Ser Ile Thr Cys Thr Val Ser Gly Phe Ser Val | |
| 35 40 45 | |
| aca agt tat ggt gta cac tgg att cgc cag tct cca gga aag ggt ctg | 192 |
| Thr Ser Tyr Gly Val His Trp Ile Arg Gln Ser Pro Gly Lys Gly Leu | |
| 50 55 60 | |
| gag tgg ctg gga gtg ata tgg agt ggt gga agc aca gac tat aat gca | 240 |
| Glu Trp Leu Gly Val Ile Trp Ser Gly Gly Ser Thr Asp Tyr Asn Ala | |
| 65 70 75 80 | |
| gct ttc ata tcc aga ctg acc atc agc aag gac aac tcc aag agc caa | 288 |
| Ala Phe Ile Ser Arg Leu Thr Ile Ser Lys Asp Asn Ser Lys Ser Gln | |
| 85 90 95 | |
| gtt ttc ttt aaa gtg aac agt ctg caa cct gct gac aca gcc ata tac | 336 |
| Val Phe Phe Lys Val Asn Ser Leu Gln Pro Ala Asp Thr Ala Ile Tyr | |
| 100 105 110 | |
| tat tgt gcc aga gct ggg gac tat aat tac gac ggt ttt gct tac tgg | 384 |
| Tyr Cys Ala Arg Ala Gly Asp Tyr Asn Tyr Asp Gly Phe Ala Tyr Trp | |
| 115 120 125 | |
| ggc caa ggg act ctg gtc act gtc tct gcg | 414 |
| Gly Gln Gly Thr Leu Val Thr Val Ser Ala | |
| 130 135 | |

<210> 33

<211> 138

<212> PRT

<213> Artificial Sequence

<220>

<223> Heavy chain variable region of mik-betal

<400> 33

Met Ala Val Leu Gly Leu Leu Phe Cys Leu Val Thr Phe Pro Ser Cys
1 5 10 15

Val Leu Ser Gln Val Gln Leu Lys Gln Ser Gly Pro Gly Leu Val Gln
20 25 30

Pro Ser Gln Ser Leu Ser Ile Thr Cys Thr Val Ser Gly Phe Ser Val
35 40 45

Thr Ser Tyr Gly Val His Trp Ile Arg Gln Ser Pro Gly Lys Gly Leu
50 55 60

Glu Trp Leu Gly Val Ile Trp Ser Gly Gly Ser Thr Asp Tyr Asn Ala
65 70 75 80

Ala Phe Ile Ser Arg Leu Thr Ile Ser Lys Asp Asn Ser Lys Ser Gln
85 90 95

Val Phe Phe Lys Val Asn Ser Leu Gln Pro Ala Asp Thr Ala Ile Tyr
100 105 110

Tyr Cys Ala Arg Ala Gly Asp Tyr Asn Tyr Asp Gly Phe Ala Tyr Trp
115 120 125

Gly Gln Gly Thr Leu Val Thr Val Ser Ala
130 135

<210> 34

<211> 107

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence of light chain for human Lay Ab

<400> 34

Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Val Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Gln Ala Ser Gln Asn Val Asn Ala Tyr
20 25 30

Leu Asn Trp Tyr Gln Gln Lys Pro Gly Leu Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Gly Ala Ser Thr Arg Glu Ala Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Phe Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Ile Ala Thr Tyr Tyr Cys Gln Gln Tyr Asn Asn Trp Pro Pro
85 90 95

Thr Phe Gly Gln Gly Thr Lys Val Glu Val Lys
100 105

<210> 35

<211> 106

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence of light chain for humanized mik-betal Ab

<400> 35

Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Ser Gly Ser Ser Ser Val Ser Phe Met
20 25 30

Tyr Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile Tyr

| | | |
|---|-----|-----|
| 35 | 40 | 45 |
| Asp Thr Ser Asn Leu Ala Ser Gly Val Pro Ser Arg Phe Ser Gly Ser | | |
| 50 | 55 | 60 |
| Gly Ser Gly Thr Asp Tyr Thr Phe Thr Ile Ser Ser Leu Gln Pro Glu | | |
| 65 | 70 | 75 |
| Asp Ile Ala Thr Tyr Tyr Cys Gln Gln Trp Ser Thr Tyr Pro Leu Thr | | |
| | 85 | 90 |
| Phe Gly Gln Gly Thr Lys Val Glu Val Lys | | |
| | 100 | 105 |
| <210> 36 | | |
| <211> 122 | | |
| <212> PRT | | |
| <213> Artificial Sequence | | |
| <220> | | |
| <223> Amino acid sequence of heavy chain for human Lay Ab | | |
| <400> 36 | | |
| Ala Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly | | |
| 1 | 5 | 10 |
| Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ala Ser | | |
| | 20 | 25 |
| Ala Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val | | |
| | 35 | 40 |
| Ala Trp Lys Tyr Glu Asn Gly Asn Asp Lys His Tyr Ala Asp Ser Val | | |
| 50 | 55 | 60 |
| Asn Gly Arg Phe Thr Ile Ser Arg Asn Asp Ser Lys Asn Thr Leu Tyr | | |
| 65 | 70 | 75 |
| Leu Gln Met Asn Gly Leu Gln Ala Glx Val Ser Ala Ile Tyr Tyr Cys | | |
| | 85 | 90 |
| Ala Arg Asp Ala Gly Pro Tyr Val Ser Pro Thr Phe Phe Ala His Trp | | |
| | 100 | 105 |
| | | 110 |

Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 37

<211> 119

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence of heavy chain for humanized mik-betal Ab

<400> 37

Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Val Thr Ser Tyr
20 25 30

Gly Val His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Gly Val Ile Trp Ser Gly Gly Ser Thr Asp Tyr Asn Ala Ala Phe Ile
50 55 60

Ser Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr Leu
65 70 75 80

Gln Met Asn Ser Leu Gln Ala Glu Asp Thr Ala Ile Tyr Tyr Cys Ala
85 90 95

Arg Ala Gly Asp Tyr Asn Tyr Asp Gly Phe Ala Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 38

<211> 107

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo vc13

<400> 38

ttctgctggt accagtacat gaaacttaca cttgagctgc cactgcaggt gatggtgacg 60

cggtcaccca ctgaggcact gaggctagat ggagactggg tcatttg 107

<210> 39

<211> 136

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo vc14

<400> 39

catgtactgg taccagcaga agccaggaaa agctccgaaa cttctgattt atgacacatc 60

caacctgggt tctggagtcc cttcccgctt cagtggcagt gggctctggga ccgattacac 120

ctttacaatc tcttca 136

<210> 40

<211> 137

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo vc15

<400> 40

tgtgtctaga aaagtgtact tacgttttac ctcgaccttg gtcccttgac cgaacgtgag 60

cgggtaagta ctccactgct ggcagtaata agtggctata tcttccggct gaagtgaaga 120

gattgtaaag gtgtaat 137

<210> 41

<211> 108

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo vc16

<400> 41
cacatctaga ccaccatgga ttttcaagtg cagatcttca gcttcctgct aatcagtgcc 60
tcagtcatac tgtccagagg agatattcaa atgacccagt ctccatct 108

<210> 42

<211> 138

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo vc11

<400> 42
tagtctgtcg acccaccact ccatatcact cccaccact cgagtcctt tccaggagcc 60
tggcggaccc agtgtacacc ataacttggt acggtgaaac cactggcggc acaagacagt 120
ctcagagatc ctcttggc 138

<210> 43

<211> 126

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo vc12

<400> 43
tggtgggtcg acagactata atgcagcttt catatccaga ttaccatca gcagagacaa 60
cagcaagaac aactgtatc tccaaatgaa tagcctgcaa gccgaggaca cagccatata 120
ttattg 126

<210> 44

<211> 130

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo wps54

<400> 44

acactctaga ccaccatggc tgtcttgggg ctgctcttct gcctgggtgac attcccaagc 60

tgtgtcctat ccgctgtcca gctgctagag agtggtggcg gtctgggtgca gccaggagga 120

tctctgagac 130

<210> 45

<211> 118

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo wps57

<400> 45

acactctaga agttaggact cacctgaaga gacagtgacc agagtccctt ggccccagta 60

agcaaaaccg tcgtaattat agtccccagc tctggcacia taatatatgg ctgtgtcc 118

<210> 46

<211> 111

<212> PRT

<213> Mus sp.

<400> 46

Asp Ile Val Leu Thr Gln Ser Pro Ala Ser Leu Ala Val Ser Leu Gly
1 5 10 15

Gln Arg Ala Thr Ile Ser Cys Arg Ala Ser Gln Ser Val Ser Thr Ser
20 25 30

Thr Tyr Asn Tyr Met His Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro
35 40 45

Lys Leu Leu Ile Lys Tyr Ala Ser Asn Leu Glu Ser Gly Val Pro Ala
50 55 60

Arg Phe Ser Gly Ser Gly Phe Gly Thr Asp Phe Thr Leu Asn Ile His
65 70 75 80

Pro Val Glu Glu Glu Asp Thr Val Thr Tyr Tyr Cys Gln His Ser Trp
85 90 95

Glu Ile Pro Tyr Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys
100 105 110

<210> 47

<211> 111

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence of light chain of humanized Fd79 antibody

<400> 47

Glu Ile Val Met Thr Gln Ser Pro Ala Thr Leu Ser Val Ser Pro Gly
1 5 10 15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Thr Ser
20 25 30

Thr Tyr Asn Tyr Met His Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro
35 40 45

Arg Leu Leu Ile Lys Tyr Ala Ser Asn Leu Glu Ser Gly Ile Pro Ala
50 55 60

Arg Phe Ser Gly Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser
65 70 75 80

Arg Leu Glu Ser Glu Asp Phe Ala Val Tyr Tyr Cys Gln His Ser Trp
85 90 95

Glu Ile Pro Tyr Thr Phe Gly Gln Gly Thr Arg Val Glu Ile Lys

<400> 49

Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Asn Tyr
20 25 30

Gly Leu Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ala Ser Ile Ser Arg Gly Gly Gly Arg Ile Tyr Ser Pro Asp Asn Leu
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asn Asp Ser Lys Asn Thr Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Gln Ala Glu Asp Thr Ala Leu Tyr Tyr Cys
85 90 95

Leu Arg Glu Gly Ile Tyr Tyr Ala Asp Tyr Gly Phe Phe Asp Val Trp
100 105 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 50

<211> 107

<212> PRT

<213> Mus sp.

<400> 50

Asp Ile Val Met Thr Gln Ser His Lys Phe Met Ser Thr Ser Val Gly
1 5 10 15

Asp Arg Val Ser Ile Thr Cys Lys Ala Ser Gln Asp Val Gly Ser Ala
20 25 30

Val Val Trp His Gln Gln Lys Ser Gly Gln Ser Pro Lys Leu Leu Ile
35 40 45

Tyr Trp Ala Ser Thr Arg His Thr Gly Val Pro Asp Arg Phe Thr Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Thr Asn Val Gln Ser
65 70 75 80

Glu Asp Leu Ala Asp Tyr Phe Cys Gln Gln Tyr Ser Ile Phe Pro Leu
85 90 95

Thr Phe Gly Ala Gly Thr Arg Leu Glu Leu Lys
100 105

<210> 51

<211> 107

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence of light chain of humanized Fd138-80 antibody

<400> 51

Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Lys Ala Ser Gln Asp Val Gly Ser Ala
20 25 30

Val Val Trp His Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Trp Ala Ser Thr Arg His Thr Gly Val Pro Ser Arg Phe Thr Gly
50 55 60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Asp Asp Phe Ala Thr Tyr Phe Cys Gln Gln Tyr Ser Ile Phe Pro Leu
85 90 95

Thr Phe Gly Gln Gly Thr Lys Val Glu Val Lys
100 105

<210> 52

<211> 121

<212> PRT

<213> Mus sp.

<400> 52

Gln Val Gln Leu Gln Gln Ser Asp Ala Glu Leu Val Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Ile Ser Cys Lys Val Ser Gly Tyr Thr Phe Thr Asp His
20 25 30

Thr Ile His Trp Met Lys Gln Arg Pro Glu Gln Gly Leu Glu Trp Phe
35 40 45

Gly Tyr Ile Tyr Pro Arg Asp Gly His Thr Arg Tyr Ser Glu Lys Phe
50 55 60

Lys Gly Lys Ala Thr Leu Thr Ala Asp Lys Ser Ala Ser Thr Ala Tyr
65 70 75 80

Met His Leu Asn Ser Leu Thr Ser Glu Asp Ser Ala Val Tyr Phe Cys
85 90 95

Ala Arg Gly Arg Asp Ser Arg Glu Arg Asn Gly Phe Ala Tyr Trp Gly
100 105 110

Gln Gly Thr Leu Val Thr Val Ser Ala
115 120

<210> 53

<211> 121

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence of heavy chain of humanized Fd138-80 antibody

<400> 53

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp His

| | | | | | | | | | | | | | | | | | | | |
|---------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|--|--|
| | 20 | | 25 | | 30 | | | | | | | | | | | | | | |
| Thr | Ile | His | Trp | Met | Arg | Gln | Ala | Pro | Gly | Gln | Gly | Leu | Glu | Trp | Phe | | | | |
| | | 35 | | | | | 40 | | | | | 45 | | | | | | | |
| Gly | Tyr | Ile | Tyr | Pro | Arg | Asp | Gly | His | Thr | Arg | Tyr | Ser | Glu | Lys | Phe | | | | |
| | 50 | | | | | 55 | | | | | 60 | | | | | | | | |
| Lys | Gly | Lys | Ala | Thr | Ile | Thr | Ala | Asp | Glu | Ser | Thr | Asn | Thr | Ala | Tyr | | | | |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 | | | | |
| Met | Glu | Leu | Ser | Ser | Leu | Arg | Ser | Glu | Asp | Thr | Ala | Val | Tyr | Phe | Cys | | | | |
| | | | | 85 | | | | | 90 | | | | | 95 | | | | | |
| Ala | Arg | Gly | Arg | Asp | Ser | Arg | Glu | Arg | Asn | Gly | Phe | Ala | Tyr | Trp | Gly | | | | |
| | | | 100 | | | | | 105 | | | | | 110 | | | | | | |
| Gln | Gly | Thr | Leu | Val | Thr | Val | Ser | Ser | | | | | | | | | | | |
| | | 115 | | | | | 120 | | | | | | | | | | | | |
| <210> 54 | | | | | | | | | | | | | | | | | | | |
| <211> 111 | | | | | | | | | | | | | | | | | | | |
| <212> PRT | | | | | | | | | | | | | | | | | | | |
| <213> Artificial Sequence | | | | | | | | | | | | | | | | | | | |
| <220> | | | | | | | | | | | | | | | | | | | |
| <223> Peptide | | | | | | | | | | | | | | | | | | | |
| <400> 54 | | | | | | | | | | | | | | | | | | | |
| Asp | Ile | Val | Leu | Thr | Gln | Ser | Pro | Ala | Ser | Leu | Ala | Val | Ser | Leu | Gly | | | | |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | | | | | |
| Gln | Arg | Ala | Thr | Ile | Ser | Cys | Arg | Ala | Ser | Glu | Ser | Val | Asp | Asn | Tyr | | | | |
| | | | 20 | | | | | 25 | | | | | 30 | | | | | | |
| Gly | Ile | Ser | Phe | Met | Asn | Trp | Phe | Gln | Gln | Lys | Pro | Gly | Gln | Pro | Pro | | | | |
| | | 35 | | | | | 40 | | | | | 45 | | | | | | | |
| Lys | Leu | Leu | Ile | Tyr | Ala | Ala | Ser | Asn | Gln | Gly | Ser | Gly | Val | Pro | Ala | | | | |
| | 50 | | | | | 55 | | | | | 60 | | | | | | | | |
| Arg | Phe | Ser | Gly | Ser | Gly | Ser | Gly | Thr | Asp | Phe | Ser | Leu | Asn | Ile | His | | | | |
| 65 | | | | | 70 | | | | | 75 | | | | 80 | | | | | |

Pro Met Glu Glu Asp Asp Thr Ala Met Tyr Phe Cys Gln Gln Ser Lys
85 90 95

Glu Val Pro Trp Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys
100 105 110

<210> 55

<211> 111

<212> PRT

<213> Artificial Sequence

<220>

<223> Peptide

<400> 55

Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Glu Ser Val Asp Asn Tyr
20 25 30

Gly Ile Ser Phe Met Asn Trp Phe Gln Gln Lys Pro Gly Lys Ala Pro
35 40 45

Lys Leu Leu Ile Tyr Ala Ala Ser Asn Gln Gly Ser Gly Val Pro Ser
50 55 60

Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Asn Ile Ser
65 70 75 80

Ser Leu Gln Pro Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Lys
85 90 95

Glu Val Pro Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
100 105 110

<210> 56

<211> 116

<212> PRT

<213> Artificial Sequence

<220>

<223> Peptide

<400> 56

Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Lys Pro Gly Ala
1 5 10 15

Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp Tyr
20 25 30

Asn Met His Trp Val Lys Gln Ser His Gly Lys Ser Leu Glu Trp Ile
35 40 45

Gly Tyr Ile Tyr Pro Tyr Asn Gly Gly Thr Gly Tyr Asn Gln Lys Phe
50 55 60

Lys Ser Lys Ala Thr Leu Thr Val Asp Asn Ser Ser Ser Thr Ala Tyr
65 70 75 80

Met Asp Val Arg Ser Leu Thr Ser Glu Asp Ser Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Gly Arg Pro Ala Met Asp Tyr Trp Gly Gln Gly Thr Ser Val
100 105 110

Thr Val Ser Ser
115

<210> 57

<211> 116

<212> PRT

<213> Artificial Sequence

<220>

<223> Peptide

<400> 57

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp Tyr
 20 25 30

Asn Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
 35 40 45

Gly Tyr Ile Tyr Pro Tyr Asn Gly Gly Thr Gly Tyr Asn Gln Lys Phe
 50 55 60

Lys Ser Lys Ala Thr Ile Thr Ala Asp Glu Ser Thr Asn Thr Ala Tyr
 65 70 75 80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
 85 90 95

Ala Arg Gly Arg Pro Ala Met Asp Tyr Trp Gly Gln Gly Thr Leu Val
 100 105 110

Thr Val Ser Ser
 115

<210> 58

<211> 106

<212> PRT

<213> Artificial Sequence

<220>

<223> Peptide

<400> 58

Gln Ile Val Leu Thr Gln Ser Pro Ala Ile Met Ser Ala Ser Pro Gly
 1 5 10 15

Glu Lys Val Thr Met Thr Cys Ser Gly Ser Ser Ser Val Ser Phe Met
 20 25 30

Tyr Trp Tyr Gln Gln Arg Pro Gly Ser Ser Pro Arg Leu Leu Ile Tyr
 35 40 45

Asp Thr Ser Asn Leu Ala Ser Gly Val Pro Val Arg Phe Ser Gly Ser
 50 55 60

Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Arg Met Glu Ala Glu

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 65 | | 70 | | 75 | | 80 | | | | | | | | | |
| Asp | Ala | Ala | Thr | Tyr | Tyr | Cys | Gln | Gln | Trp | Ser | Thr | Tyr | Pro | Leu | Thr |
| | | | | 85 | | | | | 90 | | | | | 95 | |

| | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Phe | Gly | Ala | Gly | Thr | Lys | Leu | Glu | Leu | Lys |
| | | | 100 | | | | | 105 | |

<210> 59

<211> 106

<212> PRT

<213> Artificial Sequence

<220>

<223> Peptide

<400> 59

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asp | Ile | Gln | Met | Thr | Gln | Ser | Pro | Ser | Ser | Leu | Ser | Ala | Ser | Val | Gly |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asp | Arg | Val | Thr | Ile | Thr | Cys | Ser | Gly | Ser | Ser | Ser | Val | Ser | Phe | Met |
| | | | 20 | | | | | 25 | | | | | 30 | | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Tyr | Trp | Tyr | Gln | Gln | Lys | Pro | Gly | Lys | Ala | Pro | Lys | Leu | Leu | Ile | Tyr |
| | | 35 | | | | | 40 | | | | | 45 | | | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asp | Thr | Ser | Asn | Leu | Ala | Ser | Gly | Val | Pro | Ser | Arg | Phe | Ser | Gly | Ser |
| | 50 | | | | | 55 | | | | | 60 | | | | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gly | Ser | Gly | Thr | Asp | Tyr | Thr | Phe | Thr | Ile | Ser | Ser | Leu | Gln | Pro | Glu |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asp | Ile | Ala | Thr | Tyr | Tyr | Cys | Gln | Gln | Trp | Ser | Thr | Tyr | Pro | Leu | Thr |
| | | | | 85 | | | | | 90 | | | | | 95 | |

| | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Phe | Gly | Gln | Gly | Thr | Lys | Val | Glu | Val | Lys |
| | | | 100 | | | | | 105 | |

<210> 60

<211> 119

<212> PRT

<213> Artificial Sequence

<220>

<223> Peptide

<400> 60

Gln Val Gln Leu Lys Gln Ser Gly Pro Gly Leu Val Gln Pro Ser Gln
1 5 10 15

Ser Leu Ser Ile Thr Cys Thr Val Ser Gly Phe Ser Val Thr Ser Tyr
20 25 30

Gly Val His Trp Ile Arg Gln Ser Pro Gly Lys Gly Leu Glu Trp Leu
35 40 45

Gly Val Ile Trp Ser Gly Gly Ser Thr Asp Tyr Asn Ala Ala Phe Ile
50 55 60

Ser Arg Leu Thr Ile Ser Lys Asp Asn Ser Lys Ser Gln Val Phe Phe
65 70 75 80

Lys Val Asn Ser Leu Gln Pro Ala Asp Thr Ala Ile Tyr Tyr Cys Ala
85 90 95

Arg Ala Gly Asp Tyr Asn Tyr Asp Gly Phe Ala Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ala
115

<210> 61

<211> 119

<212> PRT

<213> Artificial Sequence

<220>

<223> Peptide

<400> 61

Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gln
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Val Thr Ser Tyr
20 25 30

Gly Val His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Gly Val Ile Trp Ser Gly Gly Ser Thr Asp Tyr Asn Ala Ala Phe Ile
50 55 60

Ser Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr Leu
65 70 75 80

Gln Met Asn Ser Leu Gln Ala Glu Asp Thr Ala Ile Tyr Tyr Cys Ala
85 90 95

Arg Ala Gly Asp Tyr Asn Tyr Asp Gly Phe Ala Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 62

<211> 107

<212> PRT

<213> Artificial Sequence

<220>

<223> Peptide

<400> 62

Asp Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Val Thr Pro Gly
1 5 10 15

Asp Ser Val Ser Leu Ser Cys Arg Ala Ser Gln Ser Ile Ser Asn Asn
20 25 30

Leu His Trp Tyr Gln Gln Lys Ser His Glu Ser Pro Arg Leu Leu Ile
35 40 45

Lys Tyr Ala Ser Gln Ser Ile Ser Gly Ile Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Ser Val Asn Gly Val Glu Thr
65 70 75 80

Glu Asp Phe Gly Met Tyr Phe Cys Gln Gln Ser Asn Ser Trp Pro His
85 90 95

Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys
100 105

<210> 63

<211> 107

<212> PRT

<213> Artificial Sequence

<220>

<223> Peptide

<400> 63

Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1 5 10 15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Ile Ser Asn Asn
20 25 30

Leu His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
35 40 45

Lys Tyr Ala Ser Gln Ser Ile Ser Gly Ile Pro Asp Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu Pro
65 70 75 80

Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Ser Asn Ser Trp Pro His
85 90 95

Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
100 105

<210> 64

<211> 119

<212> PRT

<213> Artificial Sequence

<220>

<223> Peptide

<400> 64

Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Lys Pro Gly Ala
1 5 10 15

Ser Met Lys Ile Ser Cys Lys Ala Ser Val Tyr Ser Phe Thr Gly Tyr
20 25 30

Thr Met Asn Trp Val Lys Gln Ser His Gly Gln Asn Leu Glu Trp Ile
35 40 45

Gly Leu Ile Asn Pro Tyr Asn Gly Gly Thr Ser Tyr Asn Gln Lys Phe
50 55 60

Lys Gly Lys Ala Thr Leu Thr Val Asp Lys Ser Ser Asn Thr Ala Tyr
65 70 75 80

Met Glu Leu Leu Ser Leu Thr Ser Ala Asp Ser Ala Val Tyr Tyr Cys
85 90 95

Thr Arg Arg Gly Phe Arg Asp Tyr Ser Met Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Ser Val Thr Val Ser Ser
115

<210> 65

<211> 119

<212> PRT

<213> Artificial Sequence

<220>

<223> Peptide

<400> 65

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Arg Val Ser Cys Lys Ala Ser Gly Tyr Ser Phe Thr Gly Tyr
20 25 30

Thr Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Gly Leu Ile Asn Pro Tyr Asn Gly Gly Thr Ser Tyr Asn Gln Lys Phe
50 55 60

Lys Gly Arg Val Thr Val Ser Leu Lys Pro Ser Phe Asn Gln Ala Tyr
65 70 75 80

Met Glu Leu Ser Ser Leu Phe Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Thr Arg Arg Gly Phe Arg Asp Tyr Ser Met Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 66

<211> 393

<212> DNA

<213> Artificial Sequence

<220>

<223> Light chain of M195 Ab

<220>

<221> CDS

<222> (1)..(393)

<223>

<400> 66

atg gag aaa gac aca ctc ctg cta tgg gtc ctg ctt ctc tgg gtt cca 48
Met Glu Lys Asp Thr Leu Leu Leu Trp Val Leu Leu Leu Trp Val Pro
1 5 10 15

ggg tcc aca ggt gac att gtg ctg acc caa tct cca gct tct ttg gct 96
Gly Ser Thr Gly Asp Ile Val Leu Thr Gln Ser Pro Ala Ser Leu Ala

| | 20 | 25 | 30 | |
|---|-----|-----|-----|-----|
| gtg tct cta ggg cag agg gcc acc atc tcc tgc aga gcc agc gaa agt | | | | 144 |
| Val Ser Leu Gly Gln Arg Ala Thr Ile Ser Cys Arg Ala Ser Glu Ser | | | | |
| | 35 | 40 | 45 | |
| ggt gat aat tat ggc att agt ttt atg aac tgg ttc caa cag aaa cca | | | | 192 |
| Val Asp Asn Tyr Gly Ile Ser Phe Met Asn Trp Phe Gln Gln Lys Pro | | | | |
| | 50 | 55 | 60 | |
| gga cag cca ccc aaa ctc ctc atc tat gct gca tcc aac caa gga tcc | | | | 240 |
| Gly Gln Pro Pro Lys Leu Leu Ile Tyr Ala Ala Ser Asn Gln Gly Ser | | | | |
| | 65 | 70 | 75 | 80 |
| ggg gtc cct gcc agg ttt agt ggc agt ggg tct ggg aca gac ttc agc | | | | 288 |
| Gly Val Pro Ala Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Ser | | | | |
| | 85 | 90 | 95 | |
| ctc aac atc cat cct atg gag gag gat gat act gca atg tat ttc tgt | | | | 336 |
| Leu Asn Ile His Pro Met Glu Glu Asp Asp Thr Ala Met Tyr Phe Cys | | | | |
| | 100 | 105 | 110 | |
| cag caa agt aag gag gtt ccg tgg acg ttc ggt gga ggc acc aag ctg | | | | 384 |
| Gln Gln Ser Lys Glu Val Pro Trp Thr Phe Gly Gly Gly Thr Lys Leu | | | | |
| | 115 | 120 | 125 | |
| gaa atc aaa | | | | 393 |
| Glu Ile Lys | | | | |
| | 130 | | | |

<210> 67

<211> 131

<212> PRT

<213> Artificial Sequence

<220>

<223> Light chain of M195 Ab

<400> 67

| |
|---|
| Met Glu Lys Asp Thr Leu Leu Leu Trp Val Leu Leu Leu Trp Val Pro |
| 1 5 10 15 |

| |
|---|
| Gly Ser Thr Gly Asp Ile Val Leu Thr Gln Ser Pro Ala Ser Leu Ala |
| 20 25 30 |

| |
|---|
| Val Ser Leu Gly Gln Arg Ala Thr Ile Ser Cys Arg Ala Ser Glu Ser |
| 35 40 45 |

| |
|---|
| Val Asp Asn Tyr Gly Ile Ser Phe Met Asn Trp Phe Gln Gln Lys Pro |
| 50 55 60 |

Gly Gln Pro Pro Lys Leu Leu Ile Tyr Ala Ala Ser Asn Gln Gly Ser
65 70 75 80

Gly Val Pro Ala Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Ser
85 90 95

Leu Asn Ile His Pro Met Glu Glu Asp Asp Thr Ala Met Tyr Phe Cys
100 105 110

Gln Gln Ser Lys Glu Val Pro Trp Thr Phe Gly Gly Gly Thr Lys Leu
115 120 125

Glu Ile Lys
130

<210> 68

<211> 405

<212> DNA

<213> Artificial Sequence

<220>

<223> Light chain of M195 Ab

<220>

<221> CDS

<222> (1)..(405)

<223>

<400> 68
atg gga tgg agc tgg atc ttt ctc ttc ctc ctg tca gga act gca ggc 48
Met Gly Trp Ser Trp Ile Phe Leu Phe Leu Leu Ser Gly Thr Ala Gly
1 5 10 15

gtc cac tct gag gtc cag ctt cag cag tca gga cct gag ctg gtg aaa 96
Val His Ser Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Lys
20 25 30

cct ggg gcc tca gtg aag ata tcc tgc aag gct tct gga tac aca ttc 144
Pro Gly Ala Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe
35 40 45

act gac tac aac atg cac tgg gtg aag cag agc cat gga aag agc ctt 192
Thr Asp Tyr Asn Met His Trp Val Lys Gln Ser His Gly Lys Ser Leu

| 50 | 55 | 60 | |
|---|-----|-----|-----|
| gag tgg att gga tat att tat cct tac aat ggt ggt act ggc tac aac | | | 240 |
| Glu Trp Ile Gly Tyr Ile Tyr Pro Tyr Asn Gly Gly Thr Gly Tyr Asn | | | |
| 65 | 70 | 75 | 80 |
| cag aag ttc aag agc aag gcc aca ttg act gta gac aat tcc tcc agc | | | 288 |
| Gln Lys Phe Lys Ser Lys Ala Thr Leu Thr Val Asp Asn Ser Ser Ser | | | |
| | 85 | 90 | 95 |
| aca gcc tac atg gac gtc cgc agc ctg aca tct gag gac tct gca gtc | | | 336 |
| Thr Ala Tyr Met Asp Val Arg Ser Leu Thr Ser Glu Asp Ser Ala Val | | | |
| | 100 | 105 | 110 |
| tat tac tgt gca aga ggg cgc ccc gct atg gac tac tgg ggt caa gga | | | 384 |
| Tyr Tyr Cys Ala Arg Gly Arg Pro Ala Met Asp Tyr Trp Gly Gln Gly | | | |
| | 115 | 120 | 125 |
| acc tca gtc acc gtc tcc tca | | | 405 |
| Thr Ser Val Thr Val Ser Ser | | | |
| | 130 | 135 | |

<210> 69

<211> 135

<212> PRT

<213> Artificial Sequence

<220>

<223> Light chain of M195 Ab

<400> 69

| |
|---|
| Met Gly Trp Ser Trp Ile Phe Leu Phe Leu Leu Ser Gly Thr Ala Gly |
| 1 5 10 15 |

| |
|---|
| Val His Ser Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Lys |
| 20 25 30 |

| |
|---|
| Pro Gly Ala Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe |
| 35 40 45 |

| |
|---|
| Thr Asp Tyr Asn Met His Trp Val Lys Gln Ser His Gly Lys Ser Leu |
| 50 55 60 |

| |
|---|
| Glu Trp Ile Gly Tyr Ile Tyr Pro Tyr Asn Gly Gly Thr Gly Tyr Asn |
| 65 70 75 80 |

| |
|---|
| Gln Lys Phe Lys Ser Lys Ala Thr Leu Thr Val Asp Asn Ser Ser Ser |
| 85 90 95 |

Thr Ala Tyr Met Asp Val Arg Ser Leu Thr Ser Glu Asp Ser Ala Val
100 105 110

Tyr Tyr Cys Ala Arg Gly Arg Pro Ala Met Asp Tyr Trp Gly Gln Gly
115 120 125

Thr Ser Val Thr Val Ser Ser
130 135

<210> 70

<211> 107

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence of light chain of M195 Ab

<400> 70

Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Asn Thr Trp
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Met
35 40 45

Tyr Lys Ala Ser Ser Leu Glu Ser Gly Val Pro Ser Arg Phe Ile Gly
50 55 60

Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asn Ser Asp Ser Lys
85 90 95

Met Phe Gly Gln Gly Thr Lys Val Glu Val Lys
100 105

<210> 71

<211> 111

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence of light chain of Eu Ab

<400> 71

Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Glu Ser Val Asp Asn Tyr
20 25 30

Gly Ile Ser Phe Met Asn Trp Phe Gln Gln Lys Pro Gly Lys Ala Pro
35 40 45

Lys Leu Leu Ile Tyr Ala Ala Ser Asn Gln Gly Ser Gly Val Pro Ser
50 55 60

Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
65 70 75 80

Ser Leu Gln Pro Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Lys
85 90 95

Glu Val Pro Trp Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
100 105 110

<210> 72

<211> 117

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence of heavy chain of M195 Ab

<400> 72

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Gly Thr Phe Ser Arg Ser
 20 25 30

Ala Ile Ile Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
 35 40 45

Gly Gly Ile Val Pro Met Phe Gly Pro Pro Asn Tyr Ala Gln Lys Phe
 50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Asn Thr Ala Tyr
 65 70 75 80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Phe Tyr Phe Cys
 85 90 95

Ala Gly Gly Tyr Gly Ile Tyr Ser Pro Glu Glu Tyr Asn Gly Gly Leu
 100 105 110

Val Thr Val Ser Ser
 115

<210> 73

<211> 116

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence of heavy chain of Eu Ab

<400> 73

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
 1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asp Tyr
 20 25 30

Asn Met His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
 35 40 45

Gly Tyr Ile Tyr Pro Tyr Asn Gly Gly Thr Gly Tyr Asn Gln Lys Phe
 50 55 60

Lys Ser Lys Ala Thr Ile Thr Ala Asp Glu Ser Thr Asn Thr Ala Tyr

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 65 | | 70 | | 75 | | 80 | | | | | | | | | |
| Met | Glu | Leu | Ser | Ser | Leu | Arg | Ser | Glu | Asp | Thr | Ala | Val | Tyr | Tyr | Cys |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Ala | Arg | Gly | Arg | Pro | Ala | Met | Asp | Tyr | Trp | Gly | Gln | Gly | Thr | Leu | Val |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Thr | Val | Ser | Ser | | | | | | | | | | | | |
| | | | 115 | | | | | | | | | | | | |

<210> 74

<211> 132

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo used to construct M195 H chain

<400> 74

| | |
|---|-----|
| tatatctaga ccaccatggg atggagctgg atctttctct tcctcctgtc aggaactgct | 60 |
| ggcgctcact ctcaggttca gctggtgcag tctggagctg aggtgaagaa gcctgggagc | 120 |
| tcagtgaagg tt | 132 |

<210> 75

<211> 133

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo used to construct M195 H chain

<400> 75

| | |
|---|-----|
| agccggtacc accattgtaa ggataaatat atccaatcca ttccaggcct tggccaggag | 60 |
| cctgcctcac ccagtgcatt ttgtagtcag tgaagggtga gccagaagct ttgcaggaaa | 120 |
| ccttcactga gct | 133 |

<210> 76

<211> 112
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligo used to construct M195 H chain
 <400> 76
 tgggtgtacc ggctacaacc agaagttcaa gagcaaggcc acaattacag cagacgagag 60
 tactaacaca gcctacatgg aactctccag cctgaggtct gaggacactg ca 112

 <210> 77
 <211> 111
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligo used to construct M195 H chain
 <400> 77
 tatatctaga ggccattctt acctgaagag acagtgacca gagtcccttg gccccagtag 60
 tccatagcgg ggcgcctct tgcgcagtaa tagactgcag tgtcctcaga c 111

 <210> 78
 <211> 122
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Oligo used to construct M195 L chain
 <400> 78
 tatatctaga ccacatgga gaaagacaca ctctgctat gggtcctgct tctctgggtt 60
 ccaggttcca caggtgacat tcagatgacc cagtctccga gctctctgtc cgcacagta 120
 gg 122

 <210> 79

<211> 122

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo used to construct M195 L chain

<400> 79

tcagaagctt aggagccttc ccgggtttct gttggaacca gttcataaag ctaatgccat 60

aattgtcgac actttcgctg gctctgcatg tgatggtgac cctgtctcct actgatgcgg 120

ac 122

<210> 80

<211> 119

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo used to construct M195 L chain

<400> 80

tcctaagctt ctgatttacg ctgcatccaa ccaaggctcc ggggtaccct ctgctttctc 60

aggcagtgga tctgggacag acttcactct caccatttca tctctgcage ctgatgact 119

<210> 81

<211> 118

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo used to construct M195 L chain

<400> 81

tatatctaga ctttggtatc tacttacgtt tgatctccac cttggtccct tgaccgaacg 60

tccacggaac ctccttactt tgctgacagt aatagggtgc gaagtcatca ggctgcag 118

<210> 82
 <211> 381
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Sequence of CMV5 light chain
 <220>
 <221> CDS
 <222> (1)..(381)
 <223>

| | |
|---|-----|
| <400> 82 | |
| atg gtt ttc aca cct cag ata ctt gga ctt atg ctt ttt tgg att tca | 48 |
| Met Val Phe Thr Pro Gln Ile Leu Gly Leu Met Leu Phe Trp Ile Ser | |
| 1 5 10 15 | |
| gcc tcc aga ggt gat att gtg cta act cag tct cca gcc acc ctg tct | 96 |
| Ala Ser Arg Gly Asp Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser | |
| 20 25 30 | |
| gtg act ccg gga gat agc gtc agt ctt tcc tgc agg gcc agc caa agt | 144 |
| Val Thr Pro Gly Asp Ser Val Ser Leu Ser Cys Arg Ala Ser Gln Ser | |
| 35 40 45 | |
| att agc aac aac cta cac tgg tat caa caa aaa tca cat gag tct cca | 192 |
| Ile Ser Asn Asn Leu His Trp Tyr Gln Gln Lys Ser His Glu Ser Pro | |
| 50 55 60 | |
| agg ctt ctc atc aag tat gct tcc cag tcc atc tct ggg atc ccc tcc | 240 |
| Arg Leu Leu Ile Lys Tyr Ala Ser Gln Ser Ile Ser Gly Ile Pro Ser | |
| 65 70 75 80 | |
| agg ttc agt ggc agt gga tca ggg aca gat ttc act ctc agt gtc aac | 288 |
| Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Ser Val Asn | |
| 85 90 95 | |
| ggg gtg gag act gaa gat ttt gga atg tat ttc tgt caa cag agt aac | 336 |
| Gly Val Glu Thr Glu Asp Phe Gly Met Tyr Phe Cys Gln Gln Ser Asn | |
| 100 105 110 | |
| agt tgg cct cat acg ttc gga ggg ggg acc aag ctg gaa ata aaa | 381 |
| Ser Trp Pro His Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys | |
| 115 120 125 | |

<210> 83
 <211> 127

<212> PRT

<213> Artificial Sequence

<220>

<223> Sequence of CMV5 light chain

<400> 83

Met Val Phe Thr Pro Gln Ile Leu Gly Leu Met Leu Phe Trp Ile Ser
1 5 10 15

Ala Ser Arg Gly Asp Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser
20 25 30

Val Thr Pro Gly Asp Ser Val Ser Leu Ser Cys Arg Ala Ser Gln Ser
35 40 45

Ile Ser Asn Asn Leu His Trp Tyr Gln Gln Lys Ser His Glu Ser Pro
50 55 60

Arg Leu Leu Ile Lys Tyr Ala Ser Gln Ser Ile Ser Gly Ile Pro Ser
65 70 75 80

Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Ser Val Asn
85 90 95

Gly Val Glu Thr Glu Asp Phe Gly Met Tyr Phe Cys Gln Gln Ser Asn
100 105 110

Ser Trp Pro His Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys
115 120 125

<210> 84

<211> 414

<212> DNA

<213> Artificial Sequence

<220>

<223> Sequence of CMV light chain variable region

<220>

<221> CDS

<222> (1)..(414)

<223>

<400> 84

| | |
|---|----|
| atg gga tgg agc tgg atc ttt ctc ttc ctc ctg tca gga act gca ggt | 48 |
| Met Gly Trp Ser Trp Ile Phe Leu Phe Leu Leu Ser Gly Thr Ala Gly | |
| 1 5 10 15 | |

| | |
|---|----|
| gtc cac tct gag gtc cag ctg caa cag tct gga cct gag ctg gtg aag | 96 |
| Val His Ser Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Lys | |
| 20 25 30 | |

| | |
|---|-----|
| cct gga gct tca atg aag ata tcc tgc aag gct tct gtt tac tca ttc | 144 |
| Pro Gly Ala Ser Met Lys Ile Ser Cys Lys Ala Ser Val Tyr Ser Phe | |
| 35 40 45 | |

| | |
|---|-----|
| act ggc tac acc atg aac tgg gtg aag cag agc cat gga cag aac ctt | 192 |
| Thr Gly Tyr Thr Met Asn Trp Val Lys Gln Ser His Gly Gln Asn Leu | |
| 50 55 60 | |

| | |
|---|-----|
| gag tgg att gga ctt att aat cct tac aat ggt ggt act agc tac aac | 240 |
| Glu Trp Ile Gly Leu Ile Asn Pro Tyr Asn Gly Gly Thr Ser Tyr Asn | |
| 65 70 75 80 | |

| | |
|---|-----|
| cag aag ttc aag ggg aag gcc aca tta act gta gac aag tca tcc aac | 288 |
| Gln Lys Phe Lys Gly Lys Ala Thr Leu Thr Val Asp Lys Ser Ser Asn | |
| 85 90 95 | |

| | |
|---|-----|
| aca gcc tac atg gag ctc ctc agt ctg aca tct gcg gac tct gca gtc | 336 |
| Thr Ala Tyr Met Glu Leu Leu Ser Leu Thr Ser Ala Asp Ser Ala Val | |
| 100 105 110 | |

| | |
|---|-----|
| tat tac tgt aca aga cgg ggg ttt cga gac tat tct atg gac tac tgg | 384 |
| Tyr Tyr Cys Thr Arg Arg Gly Phe Arg Asp Tyr Ser Met Asp Tyr Trp | |
| 115 120 125 | |

| | |
|---|-----|
| ggt caa gga acc tca gtc acc gtc tcc tca | 414 |
| Gly Gln Gly Thr Ser Val Thr Val Ser Ser | |
| 130 135 | |

<210> 85

<211> 138

<212> PRT

<213> Artificial Sequence

<220>

<223> Sequence of CMV light chain variable region

<400> 85

Met Gly Trp Ser Trp Ile Phe Leu Phe Leu Leu Ser Gly Thr Ala Gly
 1 5 10 15

Val His Ser Glu Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Lys
 20 25 30

Pro Gly Ala Ser Met Lys Ile Ser Cys Lys Ala Ser Val Tyr Ser Phe
 35 40 45

Thr Gly Tyr Thr Met Asn Trp Val Lys Gln Ser His Gly Gln Asn Leu
 50 55 60

Glu Trp Ile Gly Leu Ile Asn Pro Tyr Asn Gly Gly Thr Ser Tyr Asn
 65 70 75 80

Gln Lys Phe Lys Gly Lys Ala Thr Leu Thr Val Asp Lys Ser Ser Asn
 85 90 95

Thr Ala Tyr Met Glu Leu Leu Ser Leu Thr Ser Ala Asp Ser Ala Val
 100 105 110

Tyr Tyr Cys Thr Arg Arg Gly Phe Arg Asp Tyr Ser Met Asp Tyr Trp
 115 120 125

Gly Gln Gly Thr Ser Val Thr Val Ser Ser
 130 135

<210> 86

<211> 108

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence of Wol light chain

<400> 86

Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
 1 5 10 15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Gly
 20 25 30

Tyr Leu Gly Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
35 40 45

Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
50 55 60

Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65 70 75 80

Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Leu Gly
85 90 95

Arg Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
100 105

<210> 87

<211> 107

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence of CMV light chain

<400> 87

Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1 5 10 15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Ile Ser Asn Asn
20 25 30

Leu His Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile
35 40 45

Lys Tyr Ala Ser Gln Ser Ile Ser Gly Ile Pro Asp Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu Pro
65 70 75 80

Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Ser Asn Ser Trp Pro His
85 90 95

Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys

100

105

<210> 88

<211> 122

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence of Wol heavy chain

<400> 88

Gln Val Gln Leu Met Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Arg Val Ser Cys Lys Thr Ser Gly Gly Thr Phe Val Asp Tyr
20 25 30

Lys Gly Leu Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Gly Gln Ile Pro Leu Arg Phe Asn Gly Glu Val Lys Asn Pro Gly Ser
50 55 60

Val Val Arg Val Ser Val Ser Leu Lys Pro Ser Phe Asn Gln Ala His
65 70 75 80

Met Glu Leu Ser Ser Leu Phe Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Glu Tyr Gly Phe Asp Thr Ser Asp Tyr Tyr Tyr Tyr Tyr Trp
100 105 110

Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 89

<211> 119

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence of CMV heavy chain

<400> 89

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Arg Val Ser Cys Lys Ala Ser Gly Tyr Ser Phe Thr Gly Tyr
20 25 30

Thr Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Gly Leu Ile Asn Pro Tyr Asn Gly Gly Thr Ser Tyr Asn Gln Lys Phe
50 55 60

Lys Gly Arg Val Thr Val Ser Leu Lys Pro Ser Phe Asn Gln Ala Tyr
65 70 75 80

Met Glu Leu Ser Ser Leu Phe Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Thr Arg Arg Gly Phe Arg Asp Tyr Ser Met Asp Tyr Trp Gly Gln Gly
100 105 110

Thr Leu Val Thr Val Ser Ser
115

<210> 90

<211> 129

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo

<400> 90

tagatctaga ccaccatggt ttccacacct cagatactag gactcatgct cttctggatt 60

tcagcctcca gaggtgaaat tgtgctaact cagtctccag gcaccctaag cttatcaccg 120

ggagaaagg 129

<210> 91

<211> 128

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo

<400> 91

tagacagaat tcacgcgtac ttgataagta gacgtggagc ttgtccaggt ttttgttggt 60

accagtgtag gttgttgcta atactttggc tggccctgca ggaaagtgta gccctttctc 120

ccggtgat 128

<210> 92

<211> 113

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo

<400> 92

aagagaattc acgcgtccca gtccatctct ggaatacccg ataggttcag tggcagtgga 60

tcagggacag atttcactct cacaataagt aggctcgagc cggaagattt tgc 113

<210> 93

<211> 116

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo

<400> 93

tagatctaga gttgagaaga ctacttacgt tttatttcta ccttggtccc ttgtccgaac 60

gtatgaggcc aactgttact ctgttgacaa taatacacag caaaatcttc cggctc 116

<210> 94

<211> 134

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo

<400> 94

tatatctaga ccaccatggg atggagctgg atctttctct tcctcctgtc aggaactgca 60
ggtgtccact ctcaagtcca actggtacag tctggagctg aggttaaaaa gcctggaagt 120
tcagtaagag ttcc 134

<210> 95

<211> 134

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo

<400> 95

tatataggta ccaccattgt aaggattaat aagtccaacc cactcaagtc cttttccagg 60
tgctgtctc acccagttca tggatataccc agtgaatgag tatccggaag ctttgcagga 120
aactcttact gaac 134

<210> 96

<211> 116

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo

<400> 96

tatataggta ccagctacaa ccagaagttc aagggcagag ttacagtttc tttgaagcct 60

tcattttaacc aggcctacat ggagctcagt agtctgtttt ctgaagacac tgcagt 116

<210> 97

<211> 116

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo

<400> 97

tatatctaga ggccattctt acctgaggag acggtgacta aggttccttg accccagtag 60

tccatagaat agtctcgaaa ccccggtctt gtacagtaat agactgcagt gtcttc 116

<210> 98

<211> 408

<212> DNA

<213> Artificial Sequence

<220>

<223> Sequence of light chain of AF2 antibody

<220>

<221> CDS

<222> (1)..(408)

<223>

<400> 98

atg cat cag acc agc atg ggc atc aag atg gaa tca cag act ctg gtc 48
Met His Gln Thr Ser Met Gly Ile Lys Met Glu Ser Gln Thr Leu Val
1 5 10 15

ttc ata tcc ata ctg ctc tgg tta tat ggt gct gat ggg aac att gtt 96
Phe Ile Ser Ile Leu Leu Trp Leu Tyr Gly Ala Asp Gly Asn Ile Val
20 25 30

atg acc caa tct ccc aaa tcc atg tac gtg tca ata gga gag agg gtc 144
Met Thr Gln Ser Pro Lys Ser Met Tyr Val Ser Ile Gly Glu Arg Val
35 40 45

acc ttg agc tgc aag gcc agt gaa aat gtg gat act tat gta tcc tgg 192

| | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Thr | Leu | Ser | Cys | Lys | Ala | Ser | Glu | Asn | Val | Asp | Thr | Tyr | Val | Ser | Trp | | |
| 50 | | | | | | 55 | | | | | 60 | | | | | | |
| tat | caa | cag | aaa | cca | gag | cag | tct | cct | aaa | ctg | ctg | ata | tat | ggg | gca | 240 | |
| Tyr | Gln | Gln | Lys | Pro | Glu | Gln | Ser | Pro | Lys | Leu | Leu | Ile | Tyr | Gly | Ala | | |
| 65 | | | | | 70 | | | | 75 | | | | | 80 | | | |
| tcc | aac | cgg | tac | act | ggg | gtc | cac | gat | cgc | ttc | acg | ggc | agt | gga | tct | 288 | |
| Ser | Asn | Arg | Tyr | Thr | Gly | Val | His | Asp | Arg | Phe | Thr | Gly | Ser | Gly | Ser | | |
| | | | | 85 | | | | 90 | | | | | 95 | | | | |
| gca | aca | gat | ttc | act | ctg | acc | atc | agc | agt | gtg | cag | gct | gaa | gac | ctt | 336 | |
| Ala | Thr | Asp | Phe | Thr | Leu | Thr | Ile | Ser | Ser | Val | Gln | Ala | Glu | Asp | Leu | | |
| | | | 100 | | | | | 105 | | | | | 110 | | | | |
| gca | gat | tat | cac | tgt | gga | cag | agt | tac | aac | tat | cca | ttc | acg | ttc | ggc | 384 | |
| Ala | Asp | Tyr | His | Cys | Gly | Gln | Ser | Tyr | Asn | Tyr | Pro | Phe | Thr | Phe | Gly | | |
| | | 115 | | | | | 120 | | | | | 125 | | | | | |
| tcg | ggg | aca | aag | ttg | gaa | ata | aag | | | | | | | | | 408 | |
| Ser | Gly | Thr | Lys | Leu | Glu | Ile | Lys | | | | | | | | | | |
| | 130 | | | | | 135 | | | | | | | | | | | |

<210> 99

<211> 136

<212> PRT

<213> Artificial Sequence

<220>

<223> Sequence of light chain of AF2 antibody

<400> 99

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | His | Gln | Thr | Ser | Met | Gly | Ile | Lys | Met | Glu | Ser | Gln | Thr | Leu | Val |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Phe | Ile | Ser | Ile | Leu | Leu | Trp | Leu | Tyr | Gly | Ala | Asp | Gly | Asn | Ile | Val |
| | | | 20 | | | | | 25 | | | | | 30 | | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Thr | Gln | Ser | Pro | Lys | Ser | Met | Tyr | Val | Ser | Ile | Gly | Glu | Arg | Val |
| | | 35 | | | | | 40 | | | | | 45 | | | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Thr | Leu | Ser | Cys | Lys | Ala | Ser | Glu | Asn | Val | Asp | Thr | Tyr | Val | Ser | Trp |
| 50 | | | | | | 55 | | | | | 60 | | | | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Tyr | Gln | Gln | Lys | Pro | Glu | Gln | Ser | Pro | Lys | Leu | Leu | Ile | Tyr | Gly | Ala |
| 65 | | | | | 70 | | | | | 75 | | | | 80 | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Ser | Asn | Arg | Tyr | Thr | Gly | Val | His | Asp | Arg | Phe | Thr | Gly | Ser | Gly | Ser |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|

85

90

95

Ala Thr Asp Phe Thr Leu Thr Ile Ser Ser Val Gln Ala Glu Asp Leu
 100 105 110

Ala Asp Tyr His Cys Gly Gln Ser Tyr Asn Tyr Pro Phe Thr Phe Gly
 115 120 125

Ser Gly Thr Lys Leu Glu Ile Lys
 130 135

<210> 100

<211> 456

<212> DNA

<213> Artificial Sequence

<220>

<223> Sequence of heavy chain of AF2 antibody

<220>

<221> CDS

<222> (1)..(456)

<223>

<400> 100

atg aca tca ctg ttc tct cta cag tta ccg agc aca cag gac ctc gcc 48
 Met Thr Ser Leu Phe Ser Leu Gln Leu Pro Ser Thr Gln Asp Leu Ala
 1 5 10 15

atg gga tgg agc tgt atc atc ctc ttc ttg gta gca aca gct aca ggt 96
 Met Gly Trp Ser Cys Ile Ile Leu Phe Leu Val Ala Thr Ala Thr Gly
 20 25 30

gtc ctc tcc cag gtc caa ctg cag cag cct ggg gct gac ctt gtg atg 144
 Val Leu Ser Gln Val Gln Leu Gln Gln Pro Gly Ala Asp Leu Val Met
 35 40 45

cct ggg gct cca gtg aag ctg tcc tgc ttg gct tct ggc tac atc ttc 192
 Pro Gly Ala Pro Val Lys Leu Ser Cys Leu Ala Ser Gly Tyr Ile Phe
 50 55 60

acc agc tcc tgg ata aac tgg gtg aag cag agg cct gga cga ggc ctc 240
 Thr Ser Ser Trp Ile Asn Trp Val Lys Gln Arg Pro Gly Arg Gly Leu
 65 70 75 80

gag tgg att gga agg att gat cct tcc gat ggt gaa gtt cac tac aat 288

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Glu | Trp | Ile | Gly | Arg | Ile | Asp | Pro | Ser | Asp | Gly | Glu | Val | His | Tyr | Asn | |
| | | | | 85 | | | | | 90 | | | | | 95 | | |
| caa | gat | ttc | aag | gac | aag | gcc | aca | ctg | act | gta | gac | aaa | tcc | tcc | agc | 336 |
| Gln | Asp | Phe | Lys | Asp | Lys | Ala | Thr | Leu | Thr | Val | Asp | Lys | Ser | Ser | Ser | |
| | | | 100 | | | | | 105 | | | | | 110 | | | |
| aca | gcc | tac | atc | caa | ctc | aac | agc | ctg | aca | tct | gag | gac | tct | gcg | gtc | 384 |
| Thr | Ala | Tyr | Ile | Gln | Leu | Asn | Ser | Leu | Thr | Ser | Glu | Asp | Ser | Ala | Val | |
| | | | 115 | | | | 120 | | | | | 125 | | | | |
| tat | tac | tgt | gct | aga | gga | ttt | ctg | ccc | tgg | ttt | gct | gac | tgg | ggc | caa | 432 |
| Tyr | Tyr | Cys | Ala | Arg | Gly | Phe | Leu | Pro | Trp | Phe | Ala | Asp | Trp | Gly | Gln | |
| | | | 130 | | | 135 | | | | | 140 | | | | | |
| ggg | act | ctg | gtc | act | gtc | tct | gca | | | | | | | | | 456 |
| Gly | Thr | Leu | Val | Thr | Val | Ser | Ala | | | | | | | | | |
| 145 | | | | | | 150 | | | | | | | | | | |

<210> 101

<211> 152

<212> PRT

<213> Artificial Sequence

<220>

<223> Sequence of heavy chain of AF2 antibody

<400> 101

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Thr | Ser | Leu | Phe | Ser | Leu | Gln | Leu | Pro | Ser | Thr | Gln | Asp | Leu | Ala |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Gly | Trp | Ser | Cys | Ile | Ile | Leu | Phe | Leu | Val | Ala | Thr | Ala | Thr | Gly |
| | | | 20 | | | | | 25 | | | | | 30 | | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Val | Leu | Ser | Gln | Val | Gln | Leu | Gln | Gln | Pro | Gly | Ala | Asp | Leu | Val | Met |
| | | | 35 | | | | 40 | | | | | 45 | | | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Pro | Gly | Ala | Pro | Val | Lys | Leu | Ser | Cys | Leu | Ala | Ser | Gly | Tyr | Ile | Phe |
| | 50 | | | | | 55 | | | | | 60 | | | | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Thr | Ser | Ser | Trp | Ile | Asn | Trp | Val | Lys | Gln | Arg | Pro | Gly | Arg | Gly | Leu |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Glu | Trp | Ile | Gly | Arg | Ile | Asp | Pro | Ser | Asp | Gly | Glu | Val | His | Tyr | Asn |
| | | | | 85 | | | | | 90 | | | | | 95 | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gln | Asp | Phe | Lys | Asp | Lys | Ala | Thr | Leu | Thr | Val | Asp | Lys | Ser | Ser | Ser |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|

| | | |
|---|-----|-----|
| 100 | 105 | 110 |
| Thr Ala Tyr Ile Gln Leu Asn Ser Leu Thr Ser Glu Asp Ser Ala Val | | |
| 115 | 120 | 125 |
| Tyr Tyr Cys Ala Arg Gly Phe Leu Pro Trp Phe Ala Asp Trp Gly Gln | | |
| 130 | 135 | 140 |
| Gly Thr Leu Val Thr Val Ser Ala | | |
| 145 | 150 | |

<210> 102

<211> 107

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence of light chain of Eu antibody

<400> 102

| |
|---|
| Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly |
| 1 5 10 15 |
| Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Asn Thr Trp |
| 20 25 30 |
| Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Met |
| 35 40 45 |
| Tyr Lys Ala Ser Ser Leu Glu Ser Gly Val Pro Ser Arg Phe Ile Gly |
| 50 55 60 |
| Ser Gly Ser Gly Thr Glu Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro |
| 65 70 75 80 |
| Asp Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asn Ser Asp Ser Lys |
| 85 90 95 |
| Met Phe Gly Gln Gly Thr Lys Val Glu Val Lys |
| 100 105 |

<210> 103

<211> 107

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence of light chain of AF2 antibody

<400> 103

Asp Ile Gln Met Thr Gln Ser Pro Ser Thr Leu Ser Ala Ser Val Gly
1 5 10 15

Asp Arg Val Thr Ile Thr Cys Lys Ala Ser Glu Asn Val Asp Thr Tyr
20 25 30

Val Ser Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Gly Ala Ser Asn Arg Tyr Thr Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Asp Asp Phe Ala Thr Tyr Tyr Cys Gly Gln Ser Tyr Asn Tyr Pro Phe
85 90 95

Thr Phe Gly Gln Gly Thr Lys Val Glu Val Lys
100 105

<210> 104

<211> 117

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence of heavy chain of Eu antibody

<400> 104

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Gly Thr Phe Ser Arg Ser
20 25 30

Ala Ile Ile Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Gly Ile Val Pro Met Phe Gly Pro Pro Asn Tyr Ala Gln Lys Phe
50 55 60

Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Asn Thr Ala Tyr
65 70 75 80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Phe Tyr Phe Cys
85 90 95

Ala Gly Gly Tyr Gly Ile Tyr Ser Pro Glu Glu Tyr Asn Gly Gly Leu
100 105 110

Val Thr Val Ser Ser
115

<210> 105

<211> 117

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence of heavy chain of AF2 antibody

<400> 105

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1 5 10 15

Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Ile Phe Thr Ser Ser
20 25 30

Trp Ile Asn Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45

Gly Arg Ile Asp Pro Ser Asp Gly Glu Val His Tyr Asn Gln Asp Phe
50 55 60

Lys Asp Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Asn Thr Ala Tyr
65 70 75 80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Gly Phe Leu Pro Trp Phe Ala Asp Trp Gly Gln Gly Thr Leu
100 105 110

Val Thr Val Ser Ser
115

<210> 106

<211> 115

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo

<400> 106
ttttttctag accaccatgg agaccgatac cctcctgcta tgggtcctcc tgctatgggt 60
cccaggatca accggagata ttcagatgac ccagtctccg tcgaccctct ctgct 115

<210> 107

<211> 120

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo

<400> 107
ttttaagctt gggagctttg cctggcttct gctgatacca ggatacataa gtatccacat 60
tttcaactggc cttgcagggt atggtgaccc tatccccgac gctagcagag agggtcgacg 120

<210> 108

<211> 118

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo

<400> 108

ttttaagctt ctaatttatg gggcatccaa ccggtacact ggggtacctt cacgcttcag 60

tggcagtgga tctgggaccg atttcaccct cacaatcagc tctctgcagc cagatgat 118

<210> 109

<211> 120

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo

<400> 109

ttttttctag agcaaaagtc tacttacgtt tgacctccac cttgggtcccc tgaccgaacg 60

tgaatggata gttgtaactc tgtccgcagt aataagtggc gaaatcatct ggctgcagag 120

<210> 110

<211> 114

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo

<400> 110

tttttctaga ccaccatggg atggagctgg atctttctct tcctcctgtc aggtaccgcg 60

ggcgtgcact ctcaggtcca gcttgtccag tctggggctg aagtcaagaa acct 114

<210> 111

<211> 121

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo

<400> 111

ttttgaattc tcgagaccct gtccaggggc ctgccttacc cagtttatcc aggagctagt 60

aaagatgtag ccagaagctt tgcaggagac cttcacggag ctcccagggt tcttgacttc 120

a 121

<210> 112

<211> 137

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo

<400> 112

ttttgaattc tcgagtggat gggaaggatt gatccttccg atggtgaagt tcactacaat 60

caagatttca aggaccgtgt tacaattaca gcagacgaat ccaccaatac agcctacatg 120

gaactgagca gcctgag 137

<210> 113

<211> 134

<212> DNA

<213> Artificial Sequence

<220>

<223> Oligo

<400> 113

tttttctaga ggttttaagg actcacctga ggagactgtg accagggttc cttggcccca 60

gtcagcaaac cagggcagaa atcctcttgc acagtaatag actgcagtgt cctctgatct 120

caggctgctc agtt 134